Creative destruction and employee well-being

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27. May 2009

Helsinki Center of Economic Research

Discussion Papers

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Discussion Paper No. 264
May 2009

ISSN 1795-0562

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HECER
Discussion Paper No. 264

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Abstract

We examine the effects of establishment and industry-level labor market turnover on employees' job satisfaction and perceived job insecurity. Our linked employer-employee panel data contain both survey information on employees' subjective well-being and register-based information on job and worker flows. The results show that job destruction and worker outflow measures reduce job satisfaction and especially perceived security. These effects are much weaker when the individual-specific fixed effects are taken into account. The evidence also reveals that the establishment-level job and worker flows do not translate into higher wages. These findings speak against the existence of compensating wage differentials for job uncertainty.

JEL Classification: J28, J63.

Keywords: job flows, worker flows, job satisfaction, perceived security, job instability

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* This study is funded by the Finnish Work Environment Fund and the Palkansaajasäätiö Foundation. The data can be accessed on site at the Research Laboratory of the Business Structures Unit of Statistics Finland.

CREATIVE DESTRUCTION AND EMPLOYEE WELL-BEING

INTRODUCTION

Firm dynamics – creative destruction – has been shown to account for some 20-30% of the observed productivity growth in economies around the world (e.g. Foster *et al.* 2001; Bartelsman *et al.* 2004). The creative destruction process entails simultaneous job creation and destruction and worker flows, implying that there is a positive correlation between turnover in the labor market and productivity growth.

Empirical research has also shown that policy measures can speed up productivity growth through deregulation that aim at facilitating firm dynamics. There is evidence of positive effects on productivity growth from the deregulation of product markets (e.g. Nicoletti and Scarpetta 2003), the removal of employment protection legislation (EPL) (e.g. Autor *et al.* 2007; Bassanini *et al.* 2009), and capital market reforms (e.g. Aghion *et al.* 2007).

Does this productivity-enhancing creative destruction process, however, come with the price of lower employee well-being in the form of reduced job satisfaction? Indeed, one can easily envisage that a job in an industry characterized by rapid hiring and firing would be considered to be worse than a job in an industry characterized by slower worker turnover, because rapid turnover means more uncertainty regarding the future. Also, it is fair to assume that the whole idea of EPL is to decrease uncertainty about future job prospects, because such uncertainty is generally perceived as an unpleasant thing.

A faster pace of creative destruction is also associated with fiercer product market competition. In such an environment, the scope for employee shirking and superfluous on-the-job activities is likely to be smaller than in an industry characterized by a low level of product market competition. Thus, there may indirectly exist a negative correlation between employee well-being and the pace of creative destruction owing to the negative effects on job satisfaction from a high pace of work. Indeed, there is some evidence that job satisfaction has declined slightly over time in Britain and Germany

(Green and Tsitsianis 2005), and at least in Britain, the authors ascribe part of this decline to "the intensification of work effort" (Green and Tsitsianis 2005, p. 423).

The potential effects of labor market turnover on employee well-being are particularly important, because job dissatisfaction has been found to be associated with 'negative' activities (see e.g. Warr 1999). These include lower job performance, an increase in absenteeism, more actual and intended job switching, as well as various discretionary activities, like less voluntary overtime, less prosocial activity and less adaptive behavior. All these are likely to increase the firms' costs. From society's point of view, job dissatisfaction is costly also if it leads to early retirement or withdrawal from the labor market (e.g. Van Dam *et al.* 2009). These effects can erode the originally intended positive effects of reforms on performance through the increases in labor market turnover.

In this paper, we examine empirically whether a faster pace of creative destruction negatively affects job satisfaction and perceived job security. Our rather unique data set comes from a merge of two data sets. The first one is the Finnish part of the European Community Household Panel (ECHP) for the years 1996-2001. It contains information on individual job satisfaction and various domains of it. The important aspect for our purposes is the panel aspect, which allows us to eliminate the bias stemming from individual characteristics that are not captured by other variables present in the data set that are constant over time, such as a positive personality.

The other data set that we use is the Finnish Linked Employer-Employee Data (FLEED). This data set contains comprehensive administrative records of all labor force members as well as all employers/enterprises, including information also on their establishments with near-perfect traceability of employers and employees across time. We connect the data on establishments to the data on individuals and merge this data set with ECHP. Clark *et al.* (2009) have used a similarly constructed Danish data set.

With the FLEED data we construct measures of gross job and worker flows both at the establishment and industry level and merge it with the individual data from FLEED and ECHP. We then estimate models for job satisfaction and perceived job security scores using these measures of labor market turnover as our main explaining variables.

This allows us to produce information about the objective determinants of employees' subjective well-being. In contrast, as Hamermesh (2004) observes, much of the literature on subjective well-being in economics has correlated subjective measures of well-being with various subjective responses.

As well as stating the effect of labor market turnover on employee well-being, the results of this study also have a bearing on the debate regarding the existence of compensating wage differentials. If the wage fully compensates for the negative effects of uncertainty, then in a regression of job satisfaction on measures of job uncertainty, the uncertainties should have no effect on job satisfaction. This is because the wage should fully compensate for the unfavorable job characteristics (Böckerman and Ilmakunnas 2006; Stutzer and Frey 2008).

As far as we know, no previous study has examined the connection between creative destruction and employees' well-being by using a nationally representative panel data set. However, there exists research that tackles similar issues. Clark and Postel-Vinay (2009) directly investigate the effect of EPL and unemployment insurance benefits on satisfaction with job security for a number of European countries by using ECHP. They report that satisfaction with job security is negatively related to EPL but positively affected by generous unemployment insurance benefits.[1]

This article is structured as follows. The next section provides a theoretical framework, based on compensating wage differentials. Section II describes the data set. Section III presents our estimates. Section IV offers conclusions.

I. THEORETICAL FRAMEWORK

Assume that the utility of an employee depends on wage and working conditions: $U = U(w,D,Z)$, where w is wage, D a measure of disamenity related to work, and Z all other variables that affect utility. In our case the disamenities are uncertainties caused by turbulence in the establishment or industry. It is assumed that $\partial U/\partial w = U_w > 0$ and $\partial U/\partial D = U_D < 0$. On the other hand, if uncertainty is compensated in the form of higher wages, we have $w = w(D,X)$ with $\partial w/\partial D = w_D > 0$. The vector X includes all

other determinants of wages, such as the length of education. Inserting the wage equation in the utility function gives $U = U(w(D,X),D,Z)$. Compensation of the disamenity implies that, in the margin, D does not affect utility, i.e. $dU = U_w w_D dD + U_D dD = 0$. This gives $w_D = -U_D / U_w$. That is, the marginal compensation of uncertainties in terms of wage has to equal the marginal rate of substitution of wage and the source of uncertainty. In a competitive labor market, the trade-off in terms of firms' profits between wage and working conditions would also be equal to the slope of the wage equation.

Most of the literature on compensating wage differentials has tested their existence on the basis of a hedonic wage equation $w = \theta + \phi D + X\rho$, where wage (or log of wage) is regressed on the usual control variables X and the disamenity variable D (which can also be a vector of various disamenities).[2] If the disamenity obtains a significant positive coefficient, the existence of compensating wage differentials is supported. We also present results with this approach, using as disamenities the establishment- and industry-level labor market flows.

However, in this paper, our main focus is on an alternative way of testing for the existence of compensating differentials, which is based on the utility function (see e.g. Godechot and Gurgand 2000; Stutzer and Frey 2008). If utility depends on wage and disamenities, and wage fully reflects compensation for the working conditions (i.e. $w_D = -U_D / U_w$) then inserting the wage as a function of disamenities in the utility function should wipe out the disamenities. This is easily demonstrated in the linear case $U = \alpha + \delta w + \beta D + Z\gamma$ and $w = \theta + \phi D + X\rho$, where U is measured by job satisfaction and X and Z denote all other variables. Inserting the wage function in the utility function gives the reduced form utility $U = \alpha + \delta\theta + (\beta+\delta\phi)D + Z\gamma + X\rho\delta$. The existence of compensating wage differentials implies that $\phi = -\beta/\delta$. If this constraint holds, the disamenities D are wiped out, so neither wage nor disamenity appears in the utility function. Compensating wage differential can therefore be tested by testing whether the hypothesis $\beta^* = 0$ holds in the job satisfaction equation $U = \alpha^* + \beta^* D + X\gamma^* + Z\rho^*$, where wage is not included. A significant negative coefficient for the disamenity would be evidence against compensating wage differentials. Note that the variables Z that affect utility and the variables X that affect wage can be partly the same. In this

case the estimated coefficients of these variables would be combinations of utility function and wage function parameters. However, if we are interested in testing for compensating wage differentials, these effects need not be identified separately.

Measurement of utility is not a trivial task. A natural candidate for it is employees' job satisfaction. It is a typical feature of employee surveys that job satisfaction is expressed in an ordinal scale with a few alternatives. This is also the case with the data that we are using. In addition to using employees' overall job satisfaction, we also examine the effects of labor market flows on perceived job security, because it is the domain of employees' subjective well-being that should be most closely associated with labor market turbulence.

II. DATA AND VARIABLES

The paper takes advantage of the European Community Household Panel (ECHP) for Finland over the period 1996-2001.[3] The ECHP is based on a standardized questionnaire that involves annual interviews of a representative panel of households and individuals in each European Union country (see e.g. Peracchi 2002). The fact that the ECHP is representative of the population is an important advantage. The estimates for certain narrow sectors could be subject to selection bias, if the unobserved factors that determine whether employees choose to work in the sector also influence their subjective well-being. The ECHP is composed of a separate personal file and a separate household file that can be linked with each other. In this paper, we use data from the personal file, because it is the file that contains information on subjective well-being.

We use two measures of employees' subjective well-being as our dependent variables. One's job satisfaction status is an answer to the question on satisfaction with work or main activity. Job satisfaction is measured on an ordinal 6-point Likert scale from 'not satisfied' to 'fully satisfied'. A higher value on this scale means that a person currently feels more satisfied. We also take advantage of information on perceived job security.[4] It is an answer to the question: "How satisfied are you with your present job in terms of job security?". Perceived job security is also measured on an ordinal 6-point Likert scale from 'not satisfied' to 'fully satisfied'. As is typical with the subjective measures of well-

being at work, there is a concentration of observations towards the higher end of the scale for both of these measures. Thus, the mean values are roughly 4.5 for both of our measures of satisfaction.

The fact that the ECHP for Finland can be matched to longitudinal register data, FLEED (Finnish Longitudinal Employer-Employee Data) is essential for our purposes.[5] FLEED is constructed from a number of different registers on individuals, firms and establishments that are maintained by Statistics Finland. FLEED contains information from Employment Statistics, which records each employee's employer during the last week of each year. Matching of the data sources is possible, because both the EHCP and FLEED contain the same unique personal identifiers (i.e. ID codes for persons). In addition, FLEED contains unique identifiers for firms and their establishments.

By using FLEED it is possible to calculate the establishment-level measures of job and worker flows. We take advantage of the standard measures of gross job and worker flows (Davis *et al.* 1996). The job flow measures that we use are job creation and destruction rates and the worker flow measures are worker inflow (hiring) and worker outflow (separation) rates. The churning rate, defined as the difference of the sum of worker inflow and outflow rates and the sum of job creation and destruction rates ties job and worker flows together. It is a measure of "excessive" worker turnover. In addition to the establishment-level measures of job and worker flows, we use flow measures that are calculated for 41 2-digit industries. This allows us to identify different levels of labor market turbulence that could potentially have different effects on employees' well-being. At the industry level we use, besides the measures mentioned above, the excess job reallocation rate also, defined as the difference of the sum of job creation and destruction rates and the absolute value of net employment change (at the establishment level, this measure is always zero). Figure 1 shows that there is plenty of variation in the industry-level job and worker flows.

==== Figure 1 here ====

The annual flow rates are calculated for the non-farm business sector by using information on an employee's employer during the last week of each year.[6] The public

sector is excluded, because the employer codes are not as well-defined as in the business sector and therefore the job and worker flows would not be quite comparable. The job and worker flow rates in the Finnish private sector have approximately the same order of magnitude as in other industrialized countries including the U.S. (see Davis and Haltiwanger 1999).[7]

We incorporate individual-level covariates such as employees' gender, age and education level to all models that can be regarded as 'the usual suspects', based on the literature on job satisfaction (e.g. Clark 1996).[8] The models are estimated for the wage and salary earners, aged 17-64. This produces an effective sample of some 7000 person-year observations for the period 1996-2001, depending on the specification. The exact definitions including the means and standard deviations of the variables are documented in the Appendix (Table A1).

III. RESULTS

Our basic hypothesis is that under compensating wage differentials, job and worker flows would not affect job satisfaction. However, if there are no compensating differentials, unfavorable aspects like job destruction or outflow of employees, either at the plant or industry level, should be negatively related to job satisfaction. Job creation and hiring of new employees would then be expected to have a positive effect. The turnover measures that gauge excessive turnover, churning and excess job reallocation should also be negatively related to satisfaction when compensating differentials do not hold.

The baseline specifications for employees' well-being, based on OLS, are reported in Table 1 (Models 1-3) and Table 2 (Models 1-4).[9] These models (incorrectly) assume that employees' well-being is measured by using a cardinal scale. We present them because OLS is widely used in the literature and therefore they constitute a useful benchmark to which other estimates can be compared. However, we focus below on the results that include individual-specific fixed effects while preserving the ordinal nature of our satisfaction measures. The establishment and industry-level flow measures are lagged by one year in all models, i.e. the flow must happen before job satisfaction is observed.[10] All models also contain a full set of indicators for years

(waves) and NUTS2 regions. The time effects capture any changes that affect all employees' well-being in the same way. OLS models also contain a full set of industry indicators, which pick up all average differences in employees' satisfaction across industries.[11]

The OLS results for the establishment-level job and worker flows reveal that job creation is not (positively) related to satisfaction, but both job destruction and worker outflow reduce job satisfaction and perceived security (Table 1, Panels A-B, Models 1-3). The churning rate is not significant in any of the models. The point estimates of job destruction and worker outflow measures are larger for perceived security than for overall job satisfaction. This is in line with the thinking that perceived security is the domain of employees' well-being that is most adversely affected by the labor market flows. The negative effect of establishment-level worker outflow on satisfaction is against the predictions of compensating wage differentials. The quantitative magnitude of the estimate is substantial. According to the point estimate (Table 1, Panel A, Model 2), one percentage point increase in the worker outflow rate leads to a 0.1 point reduction in job satisfaction.

==== Table 1 here ====

Note that our standard worker outflow measure does not make any distinction between layoffs and voluntary quits. That being said, the distinction between layoffs and quits is not clear from the theoretical perspective, because employers can decrease workers' wages in order to produce (voluntary) quits in the non-competitive labor market.

Our standard control variables largely replicate the well-known patterns from other countries.[12] Appendix (Table A2, Column 1) reports the results for the individual-level controls from the first model in Panel A of Table 1. Job satisfaction increases with age and it is substantially higher for healthier persons. Also, married persons are more satisfied and there is some evidence that highly educated persons are less satisfied. However, the establishment size groups are not statistically significant determinants of job satisfaction. (With the Danish data, Clark *et al.* (2009, p. 439) report that employees are more satisfied in relatively small establishments.) Appendix (Table A2, Column 2) shows the estimation results by including real wage as an additional control

variable. (Real wage is not included in Tables 1-2 among the explanatory variables, because the models that are estimated in the compensating wage differentials framework should not include real wage as a control variable, as noted earlier.) High-wage workers are substantially more satisfied. With the inclusion of real wage among the explanatory variables there is also some evidence that females are more satisfied. Importantly, the estimates for the establishment-level job creation and destruction rates remain almost similar with or without real wage as an additional control variable.

The OLS estimates from the use of 41 2-digit industry-level job and worker flow measures are documented in Table 2 (Panels A-B, Models 1-4). None of the industry-level flow measures are statistically significant determinants of job satisfaction. However, it is interesting to observe that according to the OLS estimates the industry-level measures of job and worker flows have a particularly strong negative effect on perceived job security. The results reveal that both job destruction and worker outflow considerably reduce perceived security (Table 2, Panel B, Models 1 and 3). At the industry-level we can also use the excess job reallocation rate as one of the explanatory variables (Table 2, Models 2). However, it is not statistically significant, by a wide margin.

==== Table 2 here ====

Next we turn to the estimates that explicitly use the panel dimension of our linked data. Lykken and Tellegen (1996) show by using twin data that 44-80% of the variation in persons' self-assessed well-being emerges from genes and upbringing. Therefore, the individual-specific fixed effects are important determinants of subjective well-being. To include fixed effects in the ordered logit estimation, we follow the suggestion of Ferrer-i-Carbonell and Frijters (2004). They show that an ordered logit model with fixed effects can be estimated as a fixed effect logit (conditional logit) model, where the ordered data are collapsed to binary data with individual-specific thresholds. In our case, the recording of observations to "high" and "low" satisfaction is individual-specific, based on the individuals' average satisfaction scores in the panel over the period 1996-2001. In this case, only individuals with changes in their satisfaction status over time can be included. Thus, the number of observations is lower than in the baseline OLS models. The time-invariant group indicators (indicator for females and

age groups) are omitted from the set of control variables. Also, we do not incorporate indicators for industries, because most employees do not change their industry over the period 1996-2001.

Table 1 (Models 4-6) and Table 2 (Models 5-8) show the estimates by using the fixed effects methodology. These results constitute our preferred estimates. The estimates differ to some degree from the ones based on OLS. Hence, it is important to control for the individual-specific fixed effects.

The most important finding is that the effects of job and worker flows on employees' well-being are much weaker than with OLS. Despite this, the establishment-level job creation increases job satisfaction (Table 1, Panel A, Model 4). The effect of worker outflow on job satisfaction is no longer statistically significant at the conventional levels (Table 1, Panel A, Model 5). However, the effect is statistically significant at the 13% level. This result provides some additional support against the existence of compensating wage differentials, even when taking into account the individual-specific fixed effects.

The establishment-level job and worker flows are generally unrelated to perceived job security in the conditional logit model (Table 1, Panel B, Models 4-6). However, the churning rate has a statistically significant negative effect on perceived job security. Churning is a particularly interesting indicator of labor market turnover, because it captures excess worker turnover, which is a natural indicator of the intensity of restructuring at the establishment level.

None of the industry-level measures of job and worker flows is a statistically significant determinant of job satisfaction at the 10% level in the specifications that take into account the individual-specific fixed effects (Table 2, Panel A, Models 5-8). In this respect, the findings remain exactly the same compared to the OLS results. However, the job and worker flow measures at the industry level still have an influence on perceived job security (Table 2, Panel B, Models 5-8). Job destruction and worker outflow reduce perceived security. In addition, we obtain evidence that worker inflow has a positive effect on perceived job security at the industry level.

To check the robustness of the results, we have estimated fixed effects models that assume that satisfaction is measured with a cardinal scale, i.e. we used a linear panel data model with fixed effects. The basic patterns remain the same. In particular, job destruction and worker outflow measures are clearly negatively related to satisfaction. The standard errors from these models are much smaller than the ones based the method by Ferrer-i-Carbonell and Frijters (2004).

We have also estimated models that include an indicator for those who have changed their establishment during the past year.[13] There may be a tendency for dissatisfied employees to switch from the establishments with high turnover to those with low turnover. This could lead to a situation in which employees with the highest distaste for turnover are gradually moved into establishments with the lowest level of actual turnover. As a result, the estimates in Tables 1-2 could underestimate the effect of labor market turnover on satisfaction. However, the inclusion of an indicator for job changers has a rather small effect on the results (results not shown). One explanation for this is that high average unemployment over the data period (~11%) has hindered employees' efforts to improve their labor market position. The indicator for job changers obtains a statistically significant positive coefficient in most of the models. This pattern is in accordance with the results by Akerlof *et al.* (1988). They show that job changes generally lead to an increase in job satisfaction.

In addition, we have categorized the establishments for which employees work as job-creating or -destroying if those rates exceed 20%, and as high-churning if the churning rate exceeds 20%, following Golan *et al.* (2007). Using these indicators instead of the continuous rate variables, our most important results for job destruction and churning remain the same. Furthermore, we have estimated models in which we have dropped the smallest establishments (those with less than 20 employees) from the data, because the job and worker turnover rates are much higher among them. The main results remain the same. However, the standard errors of the estimates are larger, because of the reduced number of observations.

To close the section on the results, we estimate wage models in which the labor market flows are treated as job disamenities in order to check whether employees are compensated with higher wages for facing labor market turbulence at the

establishment or industry level. We focus on the specifications that take into account the individual-specific fixed effects in a linear panel data model. The results reveal that none of the establishment-level measures of labor market flows is related to wages (Table 3, Models 1-3). However, the estimates for the industry-level measures point to the positive relationship between churning and wages (Table 3, Model 7).[14] This result indicates that restructuring at the industry level is indeed beneficial for employees. This may reflect compensating differentials, but may also result from high-wage positions being created disproportionally in the reallocation process. Also, there is evidence that both industry-level job creation and worker inflow have positive effects on wages (Table 3, Models 4 and 6). All in all, the estimates in Table 3 confirm that employees are not compensated with higher wages for the establishment-level labor market turbulence that they are facing.

==== Table 3 here ====

IV. CONCLUSIONS

This is the first study of the connection between creative destruction and employees' well-being by using a nationally representative panel data set. It relies on linked employer-employee panel data that contain both information on employees' subjective well-being and comprehensive register-based information on job and worker flows in the private sector. The important aspect for our purposes is the panel aspect, which allows us to eliminate the bias stemming from individual characteristics that are not captured by other variables present in the data set that are constant over time, such as a positive personality.

We find that job destruction and worker outflow measures reduce job satisfaction and, especially, perceived security. These effects are much weaker when the unobserved individual-level heterogeneity is taken into account by using models that have individual-specific fixed effects while preserving the ordinal nature of employees' responses. In addition, the evidence reveals that the establishment-level job and worker flows do not translate into higher wages. These findings speak against the existence of compensating wage differentials. Taken together, we show that the productivity-

enhancing creative destruction process comes with the price of lower employee well-being.

REFERENCES

AGHION, P., FALLY, T. and SCARPETTA, S. (2007). Credit constraints as a barrier to the entry and post-entry growth of firms. *Economic Policy,* **22**, 731-779.

AKERLOF, G.A., ROSE, A. and YELLEN, J.L. (1988). Job switching and job satisfaction in the US labor market. *Brookings Papers on Economic Activity,* **2**, 177-248.

AUTOR, D., KERR, W.R. and KUGLER, A.D. (2007). Does employment protection reduce productivity? Evidence from US states. *Economic Journal,* **117**, F189-F217.

BARTELSMAN, E., HALTIWANGER, J. and SCARPETTA, S. (2004). Microeconomic evidence of creative destruction in industrial and developing countries. IZA Discussion Paper No. 1374.

BASSANINI, A., NUNZIATA, L. and VENN, D. (2009). Job protection legislation and productivity growth in OECD countries. *Economic Policy,* **24**, 349-402.

BÖCKERMAN, P. and ILMAKUNNAS, P. (2006). Do job disamenities raise wages or ruin job satisfaction? *International Journal of Manpower,* **27**, 290-302.

CLARK, A. (1996). Job satisfaction in Britain. *British Journal of Industrial Relations,* **34**, 189-217.

_____, KRISTENSEN, N. and WESTERGÅRD-NIELSEN, N. (2009). Job satisfaction and co-worker wages: Status or signal? *Economic Journal,* **119**, 430-447.

_____ and POSTEL-VINAY, F. (2009). Job security and job protection. *Oxford Economic Papers,* **61**, 207-239.

DAVIS, S.J. and HALTIWANGER, J. (1999). Gross job flows. In O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics.* Vol. 3B. Amsterdam: North-Holland, pp. 2711-2805.

_____, _____ and SCHUH, S. (1996). *Job Creation and Destruction.* Cambridge, Mass.: The MIT Press.

FERNÁNDEZ, R.M. and NORDMAN, C.J. (2009). Are there pecuniary compensations for working conditions? *Labour Economics,* **16**, 194-207.

FERRER-I-CARBONELL, A. and FRIJTERS, P. (2004). How important is methodology for the estimates of the determinants of happiness? *Economic Journal,* **114**, 641-659.

FOSTER, L., HALTIWANGER, J. and KRIZAN, C. (2001). Aggregate productivity growth. Lessons from microeconomic evidence. In C.R. Hulten, E.R. Dean and M.J. Harper (eds.), *New Developments in Productivity Analysis*. Chicago: University of Chicago Press, pp. 303-363.

GODECHOT, O. and GURGAND, M. (2000). Quand les salariés jugent leur salaire. *Economie et Statistique,* **331**, 3-24.

GOLAN, A., LANE, J. and McENTARFER, E. (2007). The dynamics of worker reallocation within and across industries. *Economica,* **74**, 1-20.

GREEN, F. and TSITSIANIS, M. (2005). Trends in job satisfaction in Britain and Germany. *British Journal of Industrial Relations,* **43**, 401-429.

HAMERMESH, D. (2004). Subjective outcomes in economics. *Southern Economic Journal,* **71**, 2-11.

ILMAKUNNAS, P. and MALIRANTA, M. (2003). The turnover of jobs and workers in a deep recession: Evidence from the Finnish business sector. *International Journal of Manpower,* **24**, 216-246.

LYKKEN, D. and TELLEGEN, A. (1996). Happiness is a stochastic phenomenon. *Psychological Science,* **7**, 186-189.

MAGNANI, E. (2002). Product market volatility and the adjustment of earnings to risk. *Industrial Relations,* **41**, 304-328.

MARTIKAINEN, P., MÄKI, N. and JÄNTTI, M. (2007). The effects of unemployment on mortality following workplace downsizing and workplace closure: A register-based follow-up study of Finnish men and women during economic boom and recession. *American Journal of Epidemiology,* **165**, 1070-1075.

MAURIN, E. and POSTEL-VINAY, F. (2005). The European job security gap. *Work and Occupations,* **32**, 229-252.

NICOLETTI, G. and SCARPETTA, S. (2003). Regulation, productivity and growth: OECD evidence. *Economic Policy,* **18**, 9-72.

PERACCHI, F. (2002). The ECHP: A review. *Empirical Economics,* **27**, 63-90.

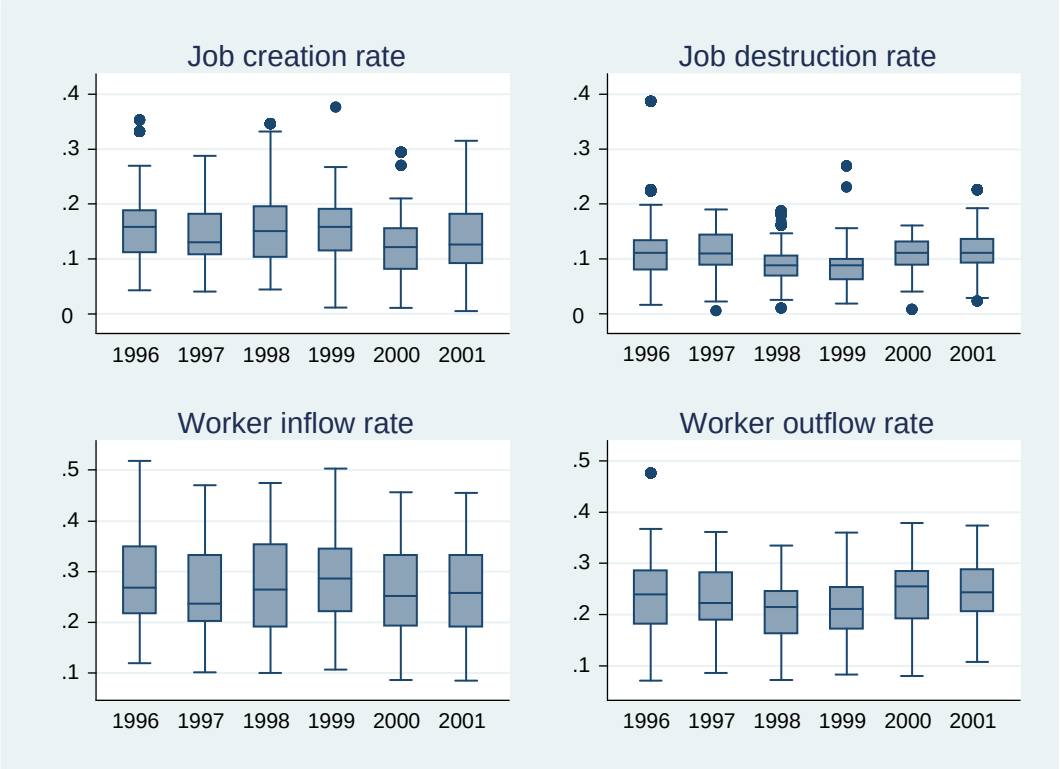
STUTZER, A. and FREY, B. (2008). Stress that doesn't pay: The commuting paradox. *Scandinavian Journal of Economics,* **110**, 339-366.

VAHTERA, J., KIVIMÄKI, M. and PENTTI, J. (1997). Effect of organisational downsizing on health of employees. *The Lancet,* **350**, 1124-1128.

Van DAM, K., van der VORST, J.D.M. and van der HEIJDEN, B.I.J.M. (2009). Employees' intentions to retire early. *Journal of Career Development,* **35**, 265-289.

WARR, P. (1999). Well-being and the workplace. In D. Kahneman, E. Diener and N. Schwarz (eds.), *Well-Being: The Foundations of Hedonic Psychology*. New York: Russell Sage Foundation, pp. 392-412.

FIGURE 1. The variation in the industry-level job and worker flows.



Notes: The box is bounded from below by the first quartile and from above by the third quartile. The horizontal line in the box shows the median value. Observations that lie lower or higher than 1.5 × (the third quartile subtracted from the first quartile) are considered to be outliers and illustrated by the dots. The smallest and largest values that are not outliers are shown by the 'whiskers' outside the box.

TABLE 1. THE EFFECT OF ESTABLISHMENT-LEVEL JOB AND WORKER FLOWS ON EMPLOYEES' WELL-BEING.

Panel A: Job satisfaction	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	FE ordered logit	FE ordered logit	FE ordered logit
Job creation rate	0.0383			0.151*		
	(0.0259)			(0.0854)		
Job destruction rate	-0.0979**			-0.153		
	(0.0474)			(0.139)		
Worker inflow rate		0.0352			0.124	
		(0.0264)			(0.0891)	
Worker outflow rate		-0.0988**			-0.205	
		(0.0440)			(0.136)	
Churning rate			-0.0329			-0.191
			(0.0509)			(0.153)
N	7423	7423	7423	5379	5379	5379
Panel B: Perceived job security	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	FE ordered logit	FE ordered logit	FE ordered logit
Job creation rate	-0.0418			0.0523		
	(0.0356)			(0.0773)		
Job destruction rate	-0.134**			-0.00637		
	(0.0650)			(0.127)		
Worker inflow rate		-0.0445			-0.00989	
		(0.0361)			(0.0812)	
Worker outflow rate		-0.122**			-0.137	
		(0.0589)			(0.122)	
Churning rate			-0.0166			-0.305**
			(0.0634)			(0.145)
N	7414	7414	7414	5708	5708	5708

Notes: The job and worker flows are lagged by one year. All models include a full set of indicators for years (waves) and regions. Models 1-3 contain a full set of indicators for industries and all the individual-level control variables that are listed in the Appendix (Table A1). Models 4-6 include the following individual-level control variables: married, education levels, self-assessed health and establishment size groups. The estimation results for the individual-level controls from the first model in Panel A are reported in the Appendix (Table A2, Column 1). Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

TABLE 2. THE EFFECT OF INDUSTRY-LEVEL JOB AND WORKER FLOWS ON EMPLOYEES' WELL-BEING.

Panel A: Job satisfaction	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	OLS	OLS	FE ordered logit	FE ordered logit	FE ordered logit	FE ordered logit
Job creation rate	-0.301				-0.779			
	(0.335)				(0.821)			
Job destruction rate	0.152				1.013			
	(0.330)				(0.790)			
Excess job reallocation rate		-0.0857				0.165		
		(0.192)				(0.440)		
Worker inflow rate			-0.307				-0.921	
			(0.325)				(0.774)	
Worker outflow rate			0.145				0.857	
			(0.324)				(0.772)	
Churning rate				0.0941				-0.562
				(0.447)				(0.869)
N	8708	8708	8708	8708	6450	6450	6450	6450
Panel B: Perceived job security	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	OLS	OLS	FE ordered logit	FE ordered logit	FE ordered logit	FE ordered logit
Job creation rate	0.484				1.181			
	(0.435)				(0.752)			
Job destruction rate	-0.964**				-1.504*			
	(0.429)				(0.809)			
Excess job reallocation rate		-0.302				-0.510		
		(0.246)				(0.449)		
Worker inflow rate			0.560				1.305*	
			(0.426)				(0.706)	
Worker outflow rate			-0.910**				-1.384*	
			(0.423)				(0.784)	
Churning rate				0.564				0.778
				(0.608)				(0.802)
N	8698	8698	8698	8698	6886	6886	6886	6886

Notes: The job and worker flows are lagged by one year. All models include a full set of indicators for years (waves) and regions. Models 1-4 also contain a full set of indicators for industries and all the individual-level control variables that are listed in the Appendix (Table A1). Models 5-8 include the following individual-level control variables: married, education levels, self-assessed health and establishment size groups. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

TABLE 3. THE EFFECT OF ESTABLISHMENT- AND INDUSTRY-LEVEL JOB AND WORKER FLOWS ON WAGES.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	FE	FE	FE	FE	FE	FE	FE
Job creation rate	-0.00419			0.144**			
	(0.00669)			(0.0692)			
Job destruction rate	-0.00396			0.00115			
	(0.00931)			(0.0674)			
Excess job reallocation rate					0.0443		
					(0.0414)		
Worker inflow rate		-0.00389				0.169**	
		(0.00670)				(0.0686)	
Worker outflow rate		-0.00251				0.0212	
		(0.00911)				(0.0659)	
Churning rate			0.00353				0.219**
			(0.0145)				(0.0895)
N	7437	7437	7437	8723	8723	8723	8723

Notes: The job and worker flows are lagged by one year. Models 1-3 are estimated by using establishment-level job and worker flows. Models 4-7 are estimated by using industry-level flows. All models include a full set of indicators for years (waves), regions and industries, and the following individual-level control variables: age groups, married, education levels, self-assessed health and establishment size groups. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

APPENDIX

TABLE A1. DEFINITIONS AND DESCRIPTIVE STATISTICS OF THE VARIABLES.

Variable	Mean (standard deviation)	Definition/measurement
Dependent variables		
Job satisfaction	4.512 (0.972)	Job satisfaction is measured on an ordinal 6-point Likert scale from 'not satisfied' to 'fully satisfied' (the question PK001). A higher value means that a person currently feels more satisfied. (Source: ECHP)
Perceived job security	4.502 (1.233)	Perceived job security is an answer to the question (PE032): "How satisfied are you with your present job in terms of job security?". Perceived job security is measured on an ordinal 6-point Likert scale from 'not satisfied' to 'fully satisfied'. A higher value means that a person currently feels more satisfied. (Source: ECHP)
Real wage	8.874 (0.439)	A logarithm of real monthly wage, deflated to the year 2000 by using the consumer price index. (Source: ECHP)
Independent variables		
Job and worker flows		
Job creation rate	0.193 (0.419)	Industry-level job creation is calculated by adding up positive employment changes at the establishment level. The rate is calculated by using as denominator the average number of employees in two consecutive years. At the establishment level job creation is positive employment change or zero. (Source: FLEED)
Job destruction rate	0.070 (0.240)	Industry-level job destruction is the sum of the absolute values of negative employment changes at the establishment level. The rate is calculated by using as denominator the average number of employees in two consecutive years. At the establishment level job destruction is the absolute value of negative employment change or zero. (Source: FLEED)
Excess job reallocation rate	0.197 (0.084)	The excess job reallocation rate equals the job reallocation rate (job creation rate + job destruction rate) minus the absolute value of the net employment change (job creation rate – job destruction rate). It measures the magnitude of gross job flows that is above what is necessary to accommodate the net employment changes. At the establishment level excess job reallocation is zero.
Worker inflow rate	0.312 (0.417)	Worker inflow is calculated by counting the number of employees who are in an establishment at the end of a year and were not there at the end of the previous year. The industry inflow is the sum of establishment inflows. The rate is calculated by using the average number of employees in the establishment during two consecutive years as the denominator. (Source: FLEED)
Worker outflow rate	0.188 (0.261)	Worker outflow is calculated by counting the number of employees who were in an establishment at the end of the previous year, but are not there at the end of the current year. The industry outflow is the sum of establishment outflows. The rate is calculated by using the average number of employees in the establishment during two consecutive years as the denominator. (Source: FLEED)
Churning rate	0.237 (0.238)	Worker flow rate (the sum of worker inflow rate and worker outflow rate) – job reallocation rate (the sum of job creation rate and job destruction rate). It measures the magnitude of worker turnover that is above what is needed to accommodate the job turnover.

Human capital variables		
Female	0.379 (0.485)	1 = female, 0 = male (Source: ECHP)
Age <=24	0.108 (0.310)	Age <= 24 = 1, otherwise = 0 (Source: ECHP)
Age 25-34	0.263 (0.440)	Age 25-34 = 1, otherwise = 0
Age 35-44	0.291 (0.454)	Age 35-44 = 1, otherwise = 0 (reference)
Age 45-54	0.270 (0.444)	Age 45-54 = 1, otherwise = 0
Age 55-64	0.068 (0.252)	Age 55-64 = 1, otherwise = 0
Married	0.599 (0.490)	Married = 1, otherwise = 0 (Source: ECHP)
Basic education only	0.216 (0.412)	Less than second stage of secondary level education (International Standard Classification of Education 0-2) = 1, otherwise = 0 (reference) (Source: ECHP)
Middle education	0.475 (0.499)	Second stage of secondary level education (ISCED 3) = 1, otherwise = 0
Higher education	0.309 (0.462)	Third level education (ISCED 5-7) = 1, otherwise = 0
Self-assessed health	3.985 (2.995)	Self-assessment of health is scaled from 1 to 5 (top condition). (We have reversed the original scale of the health measure to emphasize that higher numbers correspond to better health.) (Source: ECHP)
Employer characteristics		
Establishment size <=4	0.115 (0.319)	Size of establishment at most 4 employees = 1, otherwise = 0 (reference) (Source: FLEED)
Establishment size 5-9	0.110 (0.313)	Size of establishment 5-9 employees = 1, otherwise = 0
Establishment size 10-19	0.126 (0.332)	Size of establishment 10-19 employees = 1, otherwise = 0
Establishment size 20-49	0.163 (0.370)	Size of establishment 20-49 employees = 1, otherwise = 0
Establishment size 50-99	0.107 (0.309)	Size of establishment 50-99 employees = 1, otherwise = 0
Establishment size > 100	0.379 (0.485)	Size of establishment over 100 employees = 1, otherwise = 0
Indicators		
Years (waves)	..	Indicators for 6 years, 1996-2001
Industries	..	Indicators for 41 2-digit industries based on Standard Industry Classification
Regions	..	Indicators for 6 NUTS2 regions

Notes: Descriptive statistics refer to the establishment-level job and worker flows except in the case of the excess job reallocation rate in which they refer to the 2-digit industry-level measures.

TABLE A2. THE RESULTS FOR THE INDIVIDUAL-LEVEL CONTROLS.

	(1)	(2)
Job creation rate	0.0383	0.0405
	(0.0259)	(0.0259)
Job destruction rate	-0.0979**	-0.0819*
	(0.0474)	(0.0455)
Real wage	..	0.385***
		(0.0392)
Female	-0.0596**	0.0333
	(0.0258)	(0.0277)
Age <=24	-0.125**	0.0423
	(0.0515)	(0.0537)
Age 25-34	-0.0481	-0.00597
	(0.0307)	(0.0306)
Age 35-44	Reference	Reference
Age 45-54	0.145***	0.132***
	(0.0286)	(0.0283)
Age 55-64	0.342***	0.329***
	(0.0458)	(0.0452)
Married	0.0755***	0.0631**
	(0.0251)	(0.0249)
Basic education only	Reference	Reference
Middle education	-0.144***	-0.175***
	(0.0307)	(0.0306)
Higher education	-0.0475	-0.159***
	(0.0330)	(0.0347)
Self-assessed health	0.213***	0.204***
	(0.0177)	(0.0176)
Establishment size <=4	Reference	Reference
Establishment size 5-9	0.0441	0.0478
	(0.111)	(0.109)
Establishment size 10-19	0.110	0.0968
	(0.109)	(0.108)
Establishment size 20-49	0.0232	0.00937
	(0.109)	(0.107)
Establishment size 50-99	0.00853	-0.00927
	(0.111)	(0.109)
Establishment size >100	0.0159	-0.0200
	(0.108)	(0.106)
N	7423	7423
R^2	0.061	0.077

Notes: The first column shows the estimates for the individual-level controls from the first model in Panel A of Table 1. The second column reports otherwise similar model, but contains real wage as an additional explanatory variable. The job and worker flows are lagged by one year. Both models also include a full set of indicators for years (waves), industries and regions. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

[1] There are also related studies (e.g. Vahtera *et al.* 1997; Martikainen *et al.* 2008) that explore the effects of downsizing and workplace closures on health and mortality.

[2] Fernández and Nordman (2009) provide a recent example of this line of research.

[3] Finland was included in the ECHP for the first time in 1996 after she joined the European Union. The European Union stopped gathering data for the ECHP in 2001, which means that we have six waves of the data.

[4] Maurin and Postel-Vinay (2005), and Clark and Postel-Vinay (2009) examine perceived job insecurity in Europe using this question in the ECHP.

[5] To our knowledge, only the Danish ECHP has been previously linked to the longitudinal register data. Clark *et al.* (2009) examine the effect of co-workers' wages on job satisfaction. Their sample size is somewhat larger than ours mainly because two more waves (1994 and 1995) are available for the Danish ECHP.

[6] Worker turnover that is reversed within the year (e.g. hiring a person in January and laying him off in November) is not observed.

[7] Ilmakunnas and Maliranta (2003) provide a description of Finnish job and worker flows.

[8] The individual-level covariates originate from the ECHP with the exception that establishment-size groups are taken from FLEED, because employers' characteristics reported by employees themselves can sometimes be unreliable.

[9] To compress the presentation of the results, we do not report estimates for the net employment change, job reallocation rate (the sum of job creation and destruction) and worker turnover rate (the sum of worker inflow and outflow). For example, the estimates for the net employment change assume that the job creation and destruction rates have a symmetric effect on satisfaction. The estimation results for all measures are available upon request.

[10] We have also estimated models that use the contemporary values for the job and worker flows. Our most important results for the job destruction and worker outflow rate prevail.

[11] For the sake of consistency, we report the robust standard errors for all models. There are technical problems in the calculation of establishment-clustered standard errors, since employees that change their establishment over the period 1996-2001 belong to several different clusters.

[12] We have experimented with some other individual-level control variables as well. For example, the indicator for the part-time employees turns out to be statistically insignificant. Part-time work is rare in Finland compared with almost all OECD countries: 12% in 2000, according to the Labor Force Survey by Statistics Finland.

[13] We do not drop job changers from the data, because this would produce a biased sample.

[14] Magnani (2002) has presented earlier evidence on the positive effects of industry-specific volatility on earnings.